

Remarks

The Office Action dated October 3, 2005 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-29 are pending in this application. Claims 1, 3-7, 10, 12-15, 18, and 19 stand rejected. Claims 2, 8, 9, 11, 16, 17, and 20-29 are withdrawn from consideration.

In accordance with 37 C.F.R. 1.136(a), a one month extension of time is submitted herewith to extend the due date of the response to the Office Action dated October 3, 2005, for the above-identified patent application from January 3, 2006, through and including February 3, 2006. In accordance with 37 C.F.R. 1.17(a), authorization to charge a deposit account in the amount of \$120.00 to cover this extension of time request also is submitted herewith.

The objection to the specification under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

Applicants respectfully submit that contrary to the suggestion at pages 3-6 of the Office Action, the application contains a written description in such full, clear, concise, and exact terms as to enable one skilled in the art to make and use the invention without undue experimentation.

The claims of the present application are directed to methods of estimating the helium content of a stainless steel core shroud in a boiling water nuclear reactor. The methods are straightforward in that first the neutron fluence (either fast neutron fluence or thermal neutron fluence) is determined by either an actual measurement or by calculation using simulation incorporating a Monte Carlo radiation transport methodology. The Monte Carlo radiation transport methodology utilizes computer programs and nuclear data libraries that are known and available from the Department of Energy. The fluence is then used to estimate the helium

content of the core shroud by using an equation developed by Applicants. The specification provides ranges for the variable b_j depending on the type of fluence that has been measured. One skilled in the art would understand that a simple interpolation of the b_j ranges provides the appropriate value of b_j . Also, the specification in paragraph [0023] clearly indicates that the equation recited in the claims estimates the helium production in the shroud to within 10 percent for thermal fluences up to $1.0 \text{ e}^{21} \text{ n/cm}^2$ and for fast fluences up to $5.0 \text{ e}^{20} \text{ n/cm}^2$, and that beyond this fluence limit, a two-stage nickel reaction has contributions to helium production in the stainless steel shroud that exceeds 10 percent. Further, Applicants submit that paragraphs [0027] through [0030] describe how the correlation between neutron fluences and helium content in the core shroud was derived.

Applicants also disagree with the suggestion at page 4 of the Office Action, that the "approximations, assumptions, and estimates utilized in arriving at the correlation" are factors that are "required to properly apply the equation and operatively practice the invention". Applicants submit that to operatively practice the invention, one has to measure or estimate the fluence and using the fluence value determine the value of b_j , and then enter these values into the recited equation to produce an estimate of the amount of helium in the stainless steel core shroud of the reactor. Applicants note that the Federal Circuit has opined in *Verve LLC v. Crane Cams, Inc.*, 65 USPQ 2d 1051, 1053-1054 (Fed. Cir. 2002), that "[p]atent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field."

Further, Applicants disagree with the suggestion at page 4 of the Office Action, that the disclosure is insufficient for a list of reasons that Applicants submit are detailed in the specification or would be known by one skilled in the art. Particularly, Applicants submit that one skilled in the art would understand from reading the specification that the method applies to all types of stainless steel used to fabricate core shrouds in boiling water reactors. Applicants submit that as explained above paragraph [0023] of the specification clearly indicates that the equation recited in the claims estimates the helium production in the shroud to within 10 percent for thermal fluences up to 1.0×10^{21} n/cm² and for fast fluences up to 5.0×10^{20} n/cm², and that beyond this fluence limit, a two-stage nickel reaction has contributions to helium production in the stainless steel shroud that exceeds 10 percent. Also, Applicants submit that one skilled in the art would know from reading the specification that boron means natural boron, and that at a natural boron concentration of 3 wppm or above that impurities other than boron are insignificant because helium production is dominated by boron. Applicants further submit that the specification and the claims clearly indicate that the equation applies to boiling water reactors, and that one skilled in the art would know from reading the specification that the correlation uses an input of fluences regardless of how they are arrived at, measured or calculated, and whether the reactor was a low capacity or a high capacity reactor is irrelevant because the fluence measurements account for this. As to the reference to the Ganesan and Goel letters to the editor, there is no requirement in Section 112, first paragraph, to rebut or discuss the opinions of other scientists. Applicants submit that the claimed correlation is based on rigorous derivation of the interaction of neutrons with matter and captures any non-linearity of the interaction.

Further, Applicants submit that pre-, inter-, and post-processor software in association with a Monte Carlo radiation transport methodology are terms of art and that one skilled in the art would know the meanings.

At least for the reasons set forth above, Applicants submit that the specification meets all the requirements of Section 112, first paragraph.

For the reasons set forth above, Applicants respectfully request that the objection to the specification be withdrawn.

The rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

For the reasons set forth above, Applicant respectfully submits that the specification is written in such full, clear, concise, and exact terms as to enable any person skilled in the art to practice the described invention. Claims 1, 3-7, 10, 12-15, 18, and 19 recite methods for calculating a helium content of a stainless steel core shroud in a boiling water nuclear reactor.

For the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph, rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 be withdrawn.

The rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 under 35 U.S.C. § 112, second paragraph is respectfully traversed.

Claims 1 and 12 have been amended recite "the reactor core comprising a plurality of fuel rods and a fuel cycle . . . b_f is a value between about $2.20e^{-21}$ and about $2.50e^{-21}$ for a thermal neutron fluence, and between about $3.80e^{-21}$ and about $5.00e^{-21}$ for fast neutron fluence". This amendment corrects the antecedent basis problem of the term "the fuel cycle" in Claims 4 and 9,

correlate the values of b_j with the specification, and clarify the value of b_j for thermal neutron fluence and fast neutron fluence.

Also, Applicants submit that one skilled in the art knows what is meant by "full power phase of the fuel cycle". It is well known in the art that the reactor fuel cycle includes a start-up phase, a full power phase, and a shut-down phase.

For the reasons set forth above and the amendments to Claims 1 and 12, Applicants submit that Claims 1, 3-7, 10, 12-15, 18, and 19 are definite and particularly point out and distinctly claim the subject matter which Applicants regard as their invention.

For the reasons set forth above, Applicants respectfully request that the Section 112, second paragraph, rejection of Claims 1, 3-7, 10, 12-15, 18, and 19 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Favorable action is respectfully solicited.

Respectfully submitted,



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